NEC

THYRISTORS
AC03DSMA,AC03FSMA

3 A MOLD ISOLATED TRIAC

DESCRIPTION

The AC03DSMA and AC03FSMA are all diffused mold type triac granted RMS on-state current 3 A, with rated voltages up to 600 V.

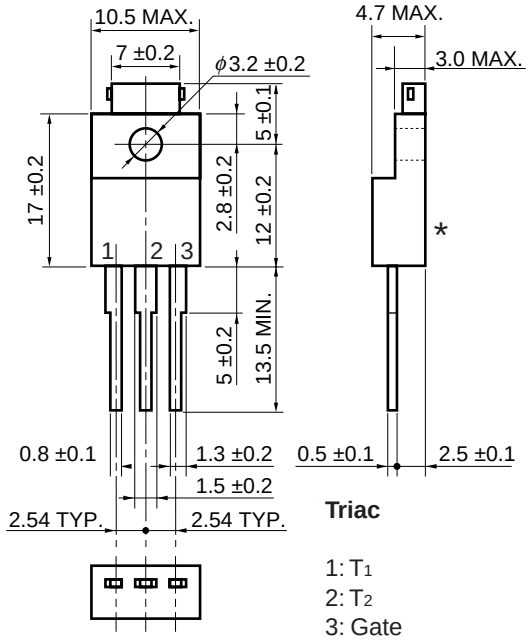
FEATURES

- Isolated plastic package (modified TO-220AB)
- 30 A surge current

APPLICATIONS

- Motor speed control
- Lamp dimmer, temperature controllers
- Various solid state switches, etc.

★ PACKAGE DRAWING (Unit: mm)



Triac

1: T_1
2: T_2
3: Gate

*: T_C test bench-mark

Standard weight: 2 g

★ MAXIMUM RATINGS

Parameter	Symbol	AC03DSMA	AC03FSMA	Unit	Remarks
Non-repetitive Peak Off-state Voltage	V_{DSM}	500	700	V	–
Repetitive Peak Off-state Voltage	V_{DRM}	400	600	V	–
RMS On-state Current	$I_{T(RMS)}$	3 (T_C = 109°C)		A	Refer to **Figure 11** and **12**.
Surge On-state Current	I_{TSM}	30 (50 Hz 1 cycle) 33 (60 Hz 1 cycle)		A	Refer to **Figure 2**.
Fusing Current	$\int i_T^2 dt$	4 (1 ms ≤ t ≤ 10 ms)		A^2s	–
Critical Rate Rise of On-state Current	dI_T/dt	40		A/μs	–
Peak Gate Power Dissipation	P_{GM}	3 (f ≥ 50 Hz, Duty ≤ 10%)		W	–
Average Gate Power Dissipation	$P_{G(AV)}$	0.3		W	–
Peak Gate Current	I_{GM}	±0.5 (f ≥ 50 Hz, Duty ≤ 10%)		A	–
Junction Temperature	T_j	–40～+125		°C	–
Storage Temperature	T_{stg}	–55～+150		°C	–

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The mark ★ shows major revised points.

★ ELECTRICAL CHARACTERISTICS (T_j = 25°C)

Parameter		Symbol	Conditions		MIN.	TYP.	MAX.	Unit	Remarks
Repetitive Peak Off-state Current		I_{DRM}	$V_{DM} = V_{DRM}$	T_j = 25°C	–	–	100	μA	–
				T_j = 125°C	–	–	1	mA	–
On-state Voltage		V_{TM}	I_{TM} = 5 A		–	–	1.8	V	Refer to **Figure 1**.
Gate Trigger Current	Mode I	I_{GT}	V_{DM} = 12 V,	T_2+, G+	–	–	12	mA	Refer to **Figure 4**.
	II		R_L = 30 Ω	T_2–, G+	–	–	–		
	III			T_2–, G–	–	–	12		
	IV			T_2+, G–	–	–	12		
Gate Trigger Voltage	Mode I	V_{GT}	V_{DM} = 12 V,	T_2+, G+	–	–	1.5	V	Refer to **Figure 4**.
	II		R_L = 30 Ω	T_2–, G+	–	–	–		
	III			T_2–, G–	–	–	1.5		
	IV			T_2+, G–	–	–	1.5		
Gate Non-trigger Voltage		V_{GD}	T_j = 125°C, $V_{DM} = \frac{1}{2} V_{DRM}$		0.2	–	–	V	–
Holding Current		I_H	V_{DM} = 24 V, I_{TM} = 5 A		–	10	–	mA	–
Critical Rate Rise of Off-state Voltage		dv/dt	T_j = 125°C, $V_{DM} = \frac{2}{3} V_{DRM}$		–	100	–	V/μs	–
Commutating Critical Rate Rise of Off-state Voltage		(dv/dt)c	T_j = 125°C, (di$_T$/dt)c = –1.6 A/ms, V_D = 400 V		5	–	–	V/μs	–
Thermal Resistance **Note**		$R_{th(j-c)}$	Junction to case		–	–	4.5	°C/W	Refer to **Figure 13**.
		$R_{th(j-a)}$	Junction to ambient		–	–	65	°C/W	

Note The thermal resistance at 50 Hz and 60 Hz sine wave current, which is shown on the follow expression.

$$R_{th(j-c)} = \frac{T_{j(max)} - T_C}{P_{T(AV)}}$$

$T_{j(max)}$: Maximum junction temperature

T_C: Case temperature

$P_{T(AV)}$: Average on-dissipation

★ TYPICAL CHARACTERISTICS

Figure 1. i_T vs. v_T CHARACTERISTIC

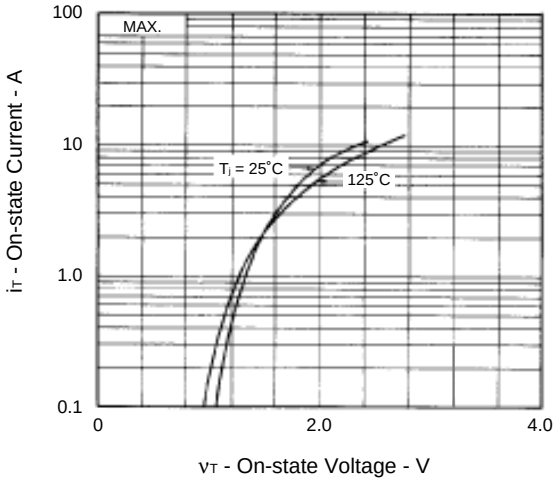


Figure 2. I_{TSM} RATING

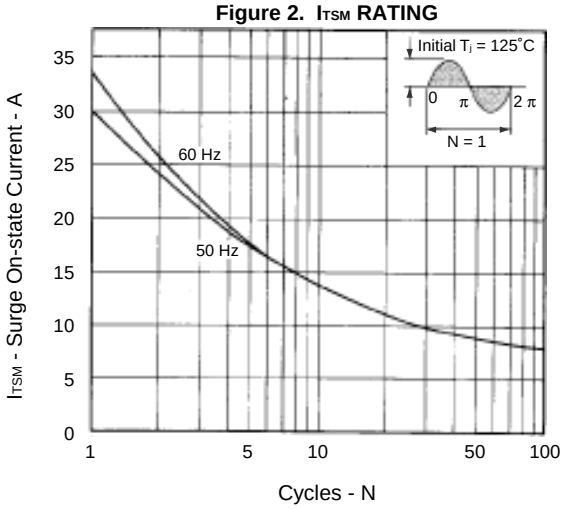


Figure 3. V_G vs. I_G RATING

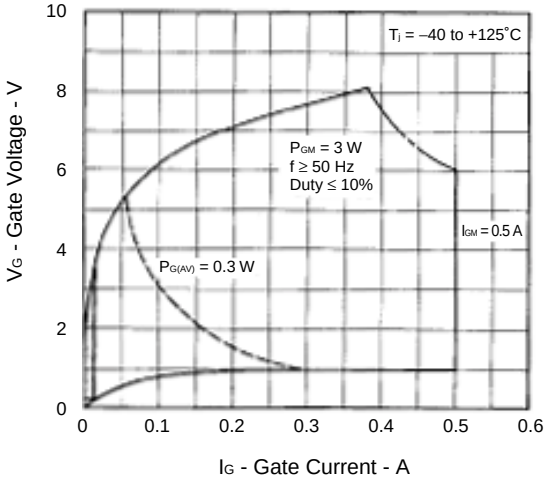


Figure 4. V_{GT} vs. I_{GT} CHARACTERISTIC

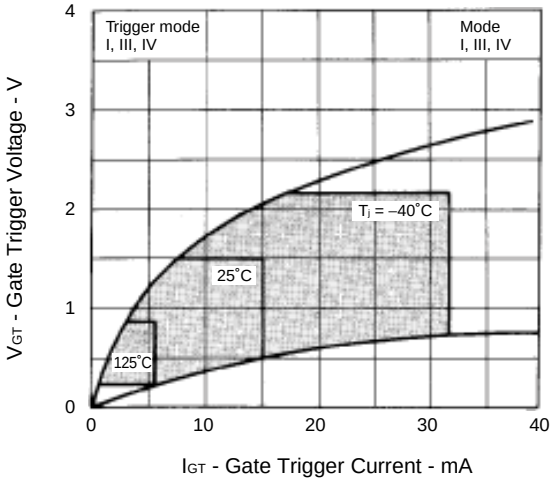


Figure 5. I_{GT} vs. T_A CHARACTERISTIC

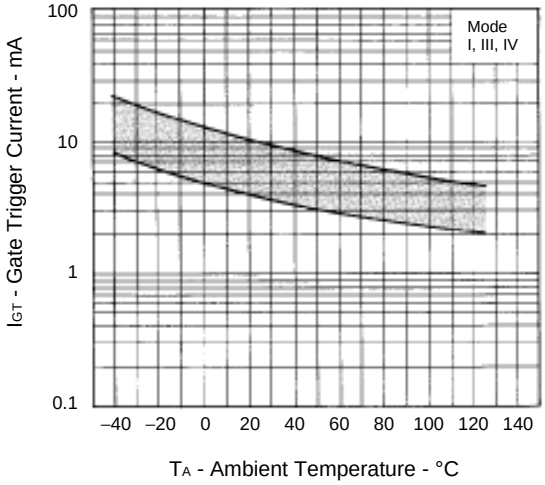


Figure 6. V_{GT} vs. T_A CHARACTERISTIC

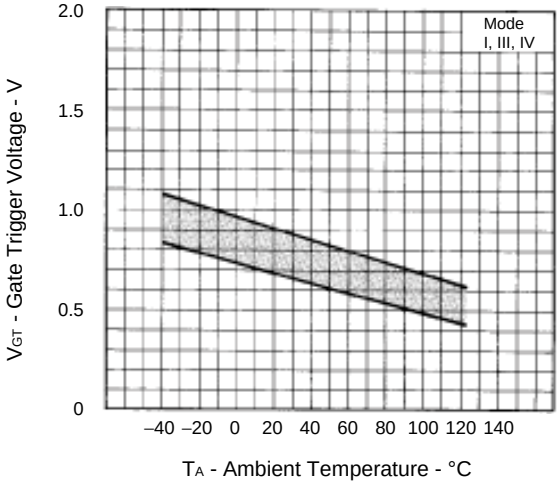


Figure 7. i_{GT} vs. τ CHARACTERISTIC

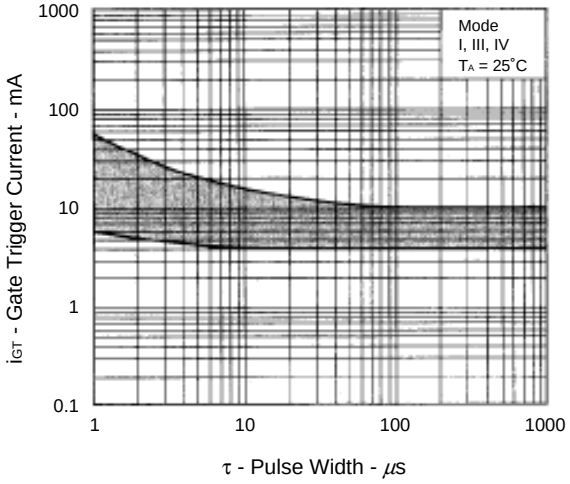


Figure 8. v_{GT} vs. τ CHARACTERISTIC

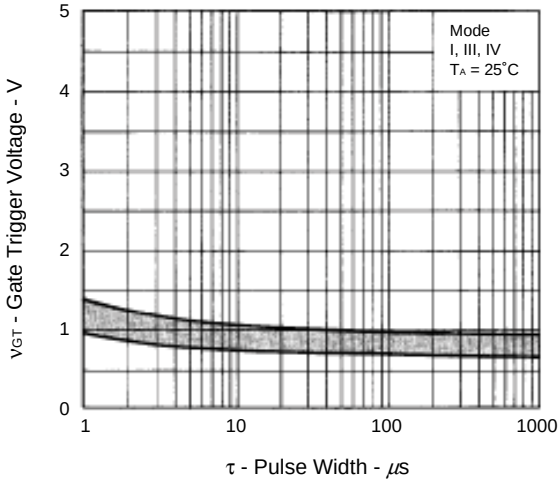


Figure 9. I_H vs. T_A CHARACTERISTIC

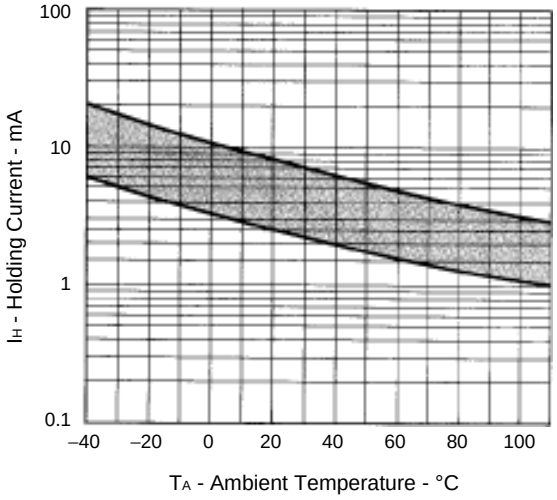


Figure 10. $P_{T(AV)}$ vs. $I_{T(RMS)}$ CHARACTERISTIC

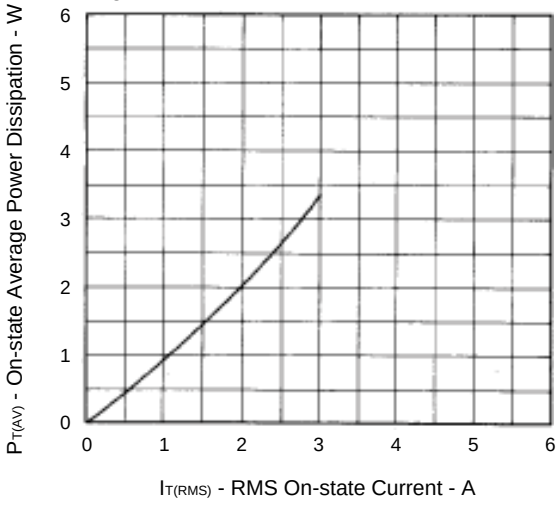


Figure 11. T_C vs. $I_{T(RMS)}$ RATING

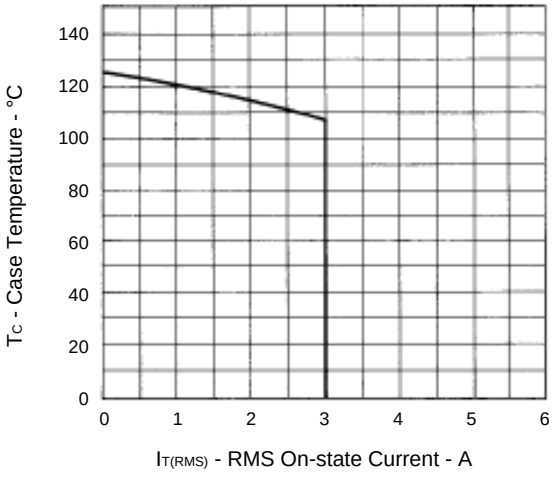


Figure 12. T_A vs. $I_{T(RMS)}$ RATING

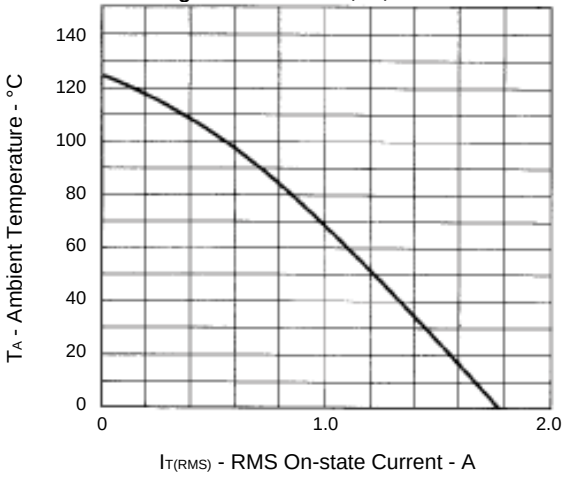
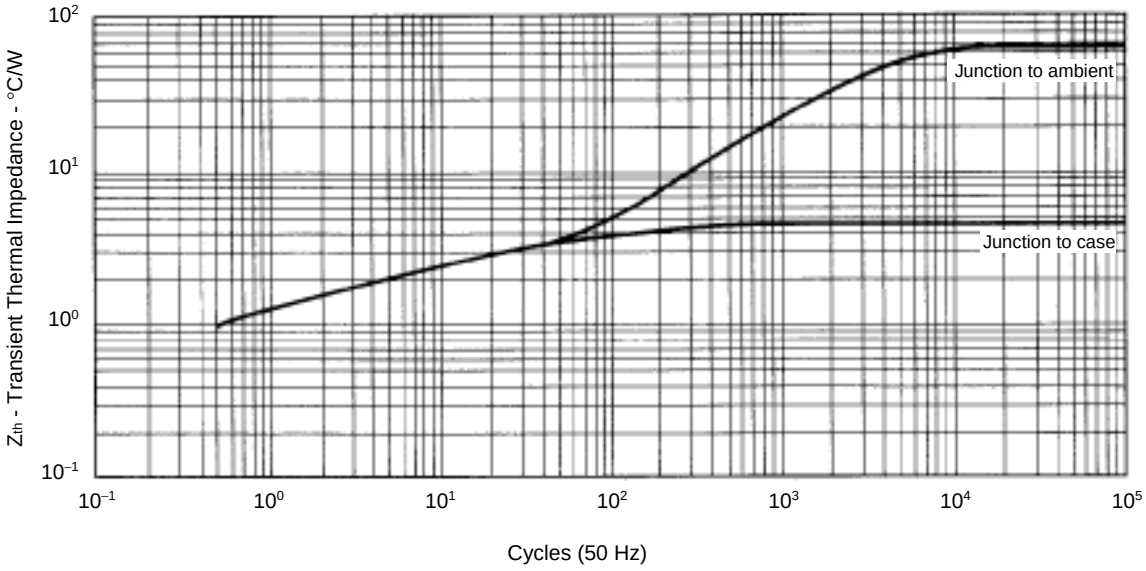


Figure 13. Z_{th} CHARACTERISTIC



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